

Subdural hematoma and death due to unnoticed dural injury during spine surgery: A case report

Unintended durotomy during spine surgery

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Abstract

Unwanted dural injury in spinal surgery has been reported at varying rates and is seen extremely often. Death as a consequence of subdural hematoma following incidental dural injury is a very rare complication. The purpose of this study is to present a case of fatal subdural hematoma as a complication of dural injury which was not noticed during surgery. Here, we present a 40-year old female with congenital kyphosis of approximately 100° at the T9-L2 level who underwent corrective spinal surgery in the form of laminectomy, foraminectomy, and partial corpectomy. The patient experienced a rapid deterioration in her level of consciousness and died within 3 days. We conclude that incidental dural injury which has not been noticed during the operation with subsequent subdural hematoma can be a fatal complication related to CSF leakage.

Keywords

Dural injury; CSF leakage; Subdural hematoma; Death

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Introduction

Incidental durotomy is one of the most commonly encountered complications during spinal surgery. In the literature, it has been reported at rates varied from 2% to as high as 20% [1]. No consensus has been reached yet on the treatment of cerebrospinal fluid (CSF) leakage which occurs after a dural tear, despite the application of intraoperative primary dural repair, lumbar drain placement, autologous epidural blood patch, increased hydration and caffeine intake, and long-term postoperative bed rest [2].

CSF leakage may cause clinical findings such as postural headache, vertigo, nausea, photophobia, blurred vision, and tinnitus [3]. There are case reports in the literature where subdural hematoma has developed after CSF leakage, which has benefited from treatment [4,5]. However, there are very few previous reports of patients who have died as a result of subdural hematoma associated with CSF leakage[6]. In this paper, we presented a patient who died as a consequence of subdural hematoma which developed secondary to CSF leakage following an unwanted dural injury during spinal surgery.

Case Report

A 40-year old female presented with congenital kyphosis of approximately 100° at the T9-L2 level (Figure 1). Surgery was recommended because the complaints of back pain had progressively worsened for 2 years and the patient had not responded to conservative treatment. It should be noted that the patient had no coagulopathy and bleeding disorder in the preoperative examination.

Under general anesthesia, 3-level total laminectomy, foraminectomy, and partial corpectomy were applied. The cord and roots that were under pressure were decompressed. The corrective procedure of total kyphectomy that was planned was left to a second session to reduce morbidity and mortality. In the macroscopic examination made during the surgery, no dural injury was determined and the Valsalva maneuver was negative. The intra-operative neuromonitoring values were within normal limits throughout the surgery.

Following the first postoperative day of monitoring in the intensive care unit, the patient was stable and transferred to the clinic on the 2nd day. The patient described complaints of a posture-related headache. The patient was conscious with the Glasgow coma scale of E4 M6 V5 15/15 and the headache was reduced with analgesics. Bedrest was applied throughout the day, with the administration of 3000 cc IV fluid and increased oral intake fluid.

A redivac drain placed below the fascia in the surgical site was used passively in the postoperative period and there was leakage up to 200 cc per day of hemorrhagic output. During follow-up, there was no reduction in the drain output, and as the color lightened, it was considered that there could be CSF leakage. The patient was being monitored conservatively and suddenly experienced an epileptic seizure and loss of consciousness, so cranial CT was applied. On the CT examination, subacute subdural effusion reaching 2cm in size was determined in the thickest area of the left fronto-parieto-occipital region, and with the 2cm shift effect, the hematoma had caused transfalcine herniation (Figure 2). Emergency surgery was

applied to perform left frontotemporoparietal craniectomy, duraplasty with autogenous subgaleal graft and the draining of the subdural haematoma. Despite the cranial decompressive surgery, pulsation was not observed to return in the herniated brain parenchyma. On the postoperative 3rd day, the patient died.



Figure 1. Anteroposterior and lateral views showing congenital kyphosis of approximately 100° at the T9-L2 level

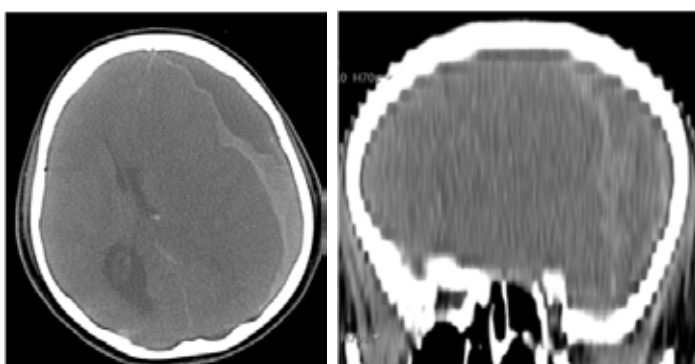


Figure 2. Brain CT showing subacute subdural hematoma in the left frontoparieto-occipital region with 2cm shift effect resulting in transfalcine herniation.

Discussion

In cases of CSF leakage, findings such as positional headache, photophobia, nausea, fluctuant subcutaneous wound, or clear drainage from the wound are often determined [3,5]. This unwanted condition may develop as a result of dural tears following an iatrogenic dural injury during spinal surgery or following lumbar puncture, spinal anesthesia, or myelography [4].

Patients with suspected CSF leakage must be evaluated clinically, radiologically, and with laboratory tests. Although CSF leakage can be proven with methods such as the measurement of beta 2 transferrin in the laboratory examination of drainage fluid, CT myelography, and CSF flow on MRI can also be considered in the diagnosis [7]. These examinations could not be applied in the current case as the symptoms developed suddenly and

the general status was poor. In our case, the diagnosis of CSF leakage was made clinically, as despite the clearing of the color of the subfascial drainage fluid, the amount was not reduced. In the evaluation of a dural tear, the most important point is that the tear is noticed during the operation. Conservative treatment of unrepaired dural tears has been reported to be not successful. The treatment of this complication includes primary repair, lumbar drain placement, hydration and postoperative bed rest [4,8].

It has been well known that CSF leakage can cause subdural hematoma. The brain moves caudally which is associated with the development of intracranial hypotension, and as a result of this movement [9], bleeding occurs related to tears in the bridging dural veins, dural sinus walls or small cerebral cortical veins. The reason behind this is that subdural veins are seen to be relatively weaker than the structure of other vein walls [10]. Iyer et al. explained that decompression performed in the setting of deformity surgery was an independent risk factor for dural tear [1]. In this case, partial corpectomy, which was performed after laminectomy, is considered a risk factor for dural injury.

As in the case presented here, intracranial hypotension may develop as a result of CSF leakage related to possible dural injury which has not been seen macroscopically during spinal procedures. As a result of this complication, which has rarely been encountered previously, patient mortality may be inevitable with the inferior movement of the cerebellar tonsils as a result of subdural hematoma.

Conclusion

In patients with suspected CSF leakage, postoperative precautions must be applied carefully. Following a dural injury which has not been noticed during the operation, it must be kept in mind that despite taking postoperative precautions, this fatal complication related to CSF leakage could develop.

Scientific Responsibility Statement

The authors declare that they are responsible for the article's scientific content including study design, data collection, analysis and interpretation, writing, some of the main line, or all of the preparation and scientific review of the contents and approval of the final version of the article.

Animal and human rights statement

All procedures performed in this study were in accordance with the ethical standards of the institutional and/or national research committee and with the 1964 Helsinki declaration and its later amendments or comparable ethical standards. No animal or human studies were carried out by the authors for this article.

Conflict of interest

None of the authors received any type of financial support that could be considered potential conflict of interest regarding the manuscript or its submission.

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